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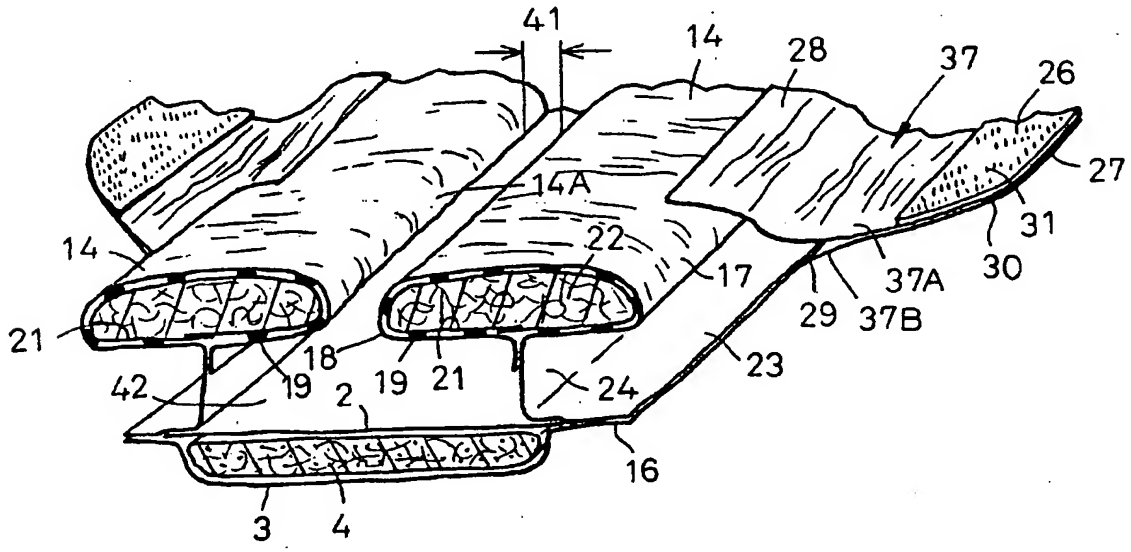
(54) Disposable diaper having anti-leakage longitudinal barriers

(57) A disposable diaper includes a pair of leak proofing walls extending side by side longitudinally of the diaper. Each of the leakage proofing walls has its top defined by a 20 - 100 mm wide cushion pad having an elastic stretchability in a longitudinal direction of the diaper and an elastic contractility in a thickness direction of the diaper. The cushion pads are normally biased to contract longitudinally of the diaper.

FIG.2



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Description

[0001] This invention relates to disposable diapers and more particularly to such diapers provided with a pair of leakage proofing walls providing a good fit to the wearer's body.

[0002] Japanese Patent Application Disclosure (Kokai) No. Sho64-68503 discloses a disposable diaper provided with leakage proofing means each including a flexible flap and an elastic member. The flap includes a first branched portion extending upward from an inner side of the diaper, a second branched portion extending inward from the first branched portion and a third branched portion extending outward from the first branched portion. The elastic member is laid on the second and third branched portions.

[0003] The leakage proofing means in the above-mentioned diaper are adapted to be placed against the wearer's skin along the first and second branched portions which are relatively flat. To achieve a high leakage proofing effect with the means disclosed in this prior art, a stretch stress of the elastic member must be sufficiently high to ensure a desired fit to the wearer's body. This is for the reason that the respective branched portions are configured to be relatively flat. However, an excessively high stretch stress may often interrupt a blood circulation and/or irritate the wearer's skin and consequently create a feeling of discomfort against the wearer. In addition, it is impossible to find in this known diaper a technical idea such that the leakage proofing means are utilized to form an excretion holing pocket and thereby to protect the wearer's skin from contact with excretion held in the pocket.

[0004] In view of the problem as described above, it is an object of the invention to provide a disposable diaper having a pair of leakage proofing walls adapted to fit the wearer's body and to achieve a high leakage proofing effect without demand for excessive tight-fit. It is another object of the invention to utilize the leakage proofing walls in order to form an excretion holding space or pocket so that the wearer's skin can be effectively protected from being stained with excretion held in the space or pocket.

[0005] According to the invention, there is provided a disposable diaper having a front waist region, a rear waist region and a crotch region extending in a longitudinal direction of said diaper therebetween, said diaper comprising a liquid-permeable topsheet, a liquid-impermeable backsheet and a liquid-absorbent core disposed therebetween, and a pair of leakage proofing walls adapted to rise up on an inner surface of said diaper when said diaper is worn, wherein said pair of leakage proofing walls have tops thereof defined by a pair of 20 ~ 100 mm wide cushion pads, each having an elastic stretchability in the longitudinal direction and an elastic contractility in a thickness direction of said diaper.

[0006] According to an embodiment of the invention, each of the cushion pads comprises a tube-like covering member made of hydrophobic nonwoven fabric, an elastic member bonded to an inner surface of the covering member under a tension in the longitudinal direction and a cushioning member composed of plural crimped filaments arranged inside the covering member so as to extend in parallel one to another in the longitudinal direction.

[0007] According to another embodiment of the invention, the cushioning member comprises filaments having a fineness of 0.5 ~ 10 deniers and occupies 30 ~ 80 % of a cross-sectional area defined by the covering member.

[0008] According to still another embodiment of the invention, there are further provided a pair of elastic wings extending outward from transversely opposite side edges of the rear waist region each having an elastic stretchability in a transverse direction of the diaper and comprising first and second elastic wings lying on inner and outer sides of the diaper, respectively; wherein the first and second elastic wings have distal ends thereof bonded together; and wherein, at proximal ends of the first and second elastic wings, the first elastic wing is at least partially bonded to the associated one of the cushion pads and the second elastic wing is bonded to an outer surface of the rear waist region along the associated side edge thereof.

[0009] According to further another embodiment of the invention, inner side edges of the respective cushion pads are spaced from each other by 0 ~ 20 mm in the crotch region.

[0010] Embodiments of the invention are described below with reference to the accompanying drawings, in which:

Fig. 1 is a perspective view of an embodiment of a partly cutaway disposable diaper according to the invention;

Fig. 2 is a fragmentary perspective view of the partly cutaway diaper in a section taken along a line II - II in Fig. 1; and

Fig. 3 is a fragmentary perspective view of the partly cutaway diaper in a section taken along a line III - III in Fig. 1.

[0011] Details of a disposable diaper according to the invention will be more fully understood from the description given hereunder with reference to the accompanying drawings.

[0012] Figs. 1, 2 and 3 depict a diaper according to the invention in a partly cutaway perspective view, and partly cutaway in fragmentary perspective views in sections taken along lines II - II and III - III, respectively, in Fig. 1. It should be understood that Fig. 2 shows the diaper as curved inward along its longitudinal direction with cushion pads 14 contracting.

[0013] Referring to these figures, the diaper is composed of a liquid-permeable topsheet 2, a liquid-impermeable backsheet 3 and a liquid-absorbent core 4. The

diaper has a front waist region 6, a rear waist region 7 and a crotch region 8 extending between these waist regions 6, 7 as viewed longitudinally of the diaper. The front and rear waist regions 6, 7 respectively have a pair of front wings 36, 36 and a pair of rear wings 37, 37 extending outward beyond transversely opposite side edges 8A, 8A of the crotch region 8, respectively. The diaper presents, in its unfolded state, a substantially hourglass-shape defined by longitudinally opposite ends 11, 12 and transversely opposite side edges 13, 13. The diaper is provided on its inner side with a pair of cushion pads 14, 14 extending in parallel to and symmetrically with respect to a longitudinal center line C - C between the longitudinally opposite ends 11, 12. The pair of cushion pads 14, 14 are elastically stretchable in their longitudinal direction and may be dimensioned so as to cover most of the inner side of the diaper except the front and rear wings 36, 36, 37, 37. Inner side edges 14A, 14A of the cushion pads 14, 14 may be arranged so as to be in contact with each other or slightly spaced from each other. In the front waist region 6, an elastic member 15 made of foamed urethane rubber extends along the front end 11 and is bonded under appropriate tension to the inner surface of the topsheet 2 and/or the backsheet 3.

[0014] As will be apparent from Fig. 2, the absorbent core 4 is disposed between- the topsheet 2 and the backsheet 3 which extend outward beyond peripheral edges of the absorbent core 4. Along these extensions, the topsheet 2 and the backsheet 3 are placed one upon another and bonded together by means of hot melt adhesive (not shown). The backsheet 3 further extends outward beyond transversely opposite side edges of the topsheet 2 to form a pair of side flaps 16 at least in the crotch region 8.

[0015] Each of the cushion pads 14 is composed of a tube-like covering member 18 formed of a hydrophobic sheet 17, a stretchable elastic member 21 bonded intermittently to the entire of an inner surface of the covering member 18 by means of hot melt adhesive 19 and a cushioning member 22 formed by filaments, preferably crimped filaments. The cushion pad 14 has a width of 20 ~ 100 mm in the crotch region 8 and in the proximity thereof. The hydrophobic sheet 17 extends from the covering member 18 to the inner surface of the diaper and its distal end 23 is folded outward of the diaper. The distal end 23 is bonded to an upper surface of the topsheet 2 by means of hot melt adhesive (not shown). The distal end 23 further extends outward and is bonded also to an upper surface of the side flap 16. A portion of the hydrophobic sheet 17 extending between the covering member 18 and the upper surface of the topsheet 2 forms a leakage proofing wall 24 adapted to dam up a quantity of body fluids which otherwise flow and leak sideways.

[0016] The hydrophobic sheet 17 is made of a relatively bulky and comfortably soft nonwoven fabric of thermoplastic synthetic fiber, preferably of crimped and conjugated fibers. More preferably, the hydrophobic sheet 17 is made of a relatively bulky nonwoven fabric which is elastically stretchable longitudinally of the diaper.

[0017] The stretchable elastic member 21 is made of material selected from a group including elastomer sheet, rubber sheet and rubber yarn. The stretchable elastic member 21 is secured to the covering member 18 under appropriate tension directed longitudinally of the diaper so as to make the covering member 18 elastically stretchable/contractile in the corresponding direction. When a sheet of urethane is employed as a specific example of the rubber sheet, preferably the sheet having a thickness of 15 ~ 40 μ and presenting a stress of 400 ~ 800 g per unit width of 25 mm as the sheet is stretched by 100 % is secured to the covering member 18 with an elongation of 60 ~ 100 %.

[0018] The filaments forming the cushioning member 22 preferably have a fineness of 0.5 ~ 10 d and their quantity to be used is preferably adjusted so as to occupy 30 ~ 80 % of the maximum sectional area of the covering member 18. The filaments extend substantially in parallel one to another longitudinally of the diaper and have their length dimensioned so that the respective filaments may have their front and rear ends spaced from the front and rear ends 11, 12 of the diaper by 10 ~ 50 mm, respectively. Some of the filaments laid in contact with the inner surface of the covering member 18 may be at least partially bonded to the inner surface. In addition, some of the filaments may have their front and/or rear ends bonded to the inner surface of the covering member 18 or to the elastic member 21.

[0019] Each of the rear wings 37 extending outward from the rear waist region 7 is composed of an inner wing 37A and an outer wing 37B both having an elastic stretchability circumferentially along the wearer's waist. Distal ends 26, 27 of these inner and outer wings 37A. 37B are put flat and bonded together by means of hot melt adhesive 30. A proximal end 28 of the inner wing 37A opposite to the distal end 26 has its inner surface at least partially bonded to an upper surface of the cushion pad 14 by means of adhesive (not shown) while a proximal end 29 of the outer wing 37B has its inner surface bonded to an outer surface of the diaper. These inner and outer wings 36A, 37B are spaced from each other except their distal ends 26, 27. The distal end 26 of the outer wing 37B has its inner surface provided with a male member 31 of the mechanical fastener commonly known under the trade mark, for example, of VELCRO.

[0020] As will be readily understood from Fig. 3, the covering member 18 contains none of the cushioning member 22 in the vicinity of the rear end 12 of the rear waist region 7, and the covering member 18, said elastic member 21 and said topsheet 2 are put flat and bonded together by means of adhesive (not shown). The pair of cushion pads 14 have their inner side edges 14A being in contact with each other along the center-line or slight-

ly spaced from each other. A condition of the cushion pad 14 in the front waist region 6 is substantially similar to that in the rear waist region 7. It should be understood, however, that a configuration of the front wing 36 in the front waist region 6 is similar to that of the flap 16 in the crotch region, i.e., the front wing 36 is composed of the backsheet 3 and the hydrophobic sheet 17 bonded thereto, as will be apparent from Fig. 1.

[0021] The diaper constructed as described hereinabove is put on the wearer's body by pulling the rear wings 37 circumferentially along the wearer's waist, placing these rear wings 37 against outer sides of the respective front wings 36 and fastening the male members 31 to the corresponding female members (not shown) provided on an outer surface of the front waist region 6. Pulling the rear wings 37 in the manner as described above causes the pair of cushion pads 14 to be moved sideways and thereby to be spaced from each other so as to form a clearance 41 adapted to receive excretion discharged on the diaper. Curving the diaper inward along its longitudinal direction, i.e., along the wearer's crotch region with the topsheet 2 inside causes the cushion pads 14 to be spaced upward from the inner surface of the diaper under contractile effect of the elastic member 21. As the cushion pads 14 are moved upward to their positions above the topsheet 2, the leakage proofing walls 24 rise up on the inner surface of the diaper. The leakage proofing walls 24 cooperate with the respective cushion pads 14 to form a space or pocket 42 on the inner surface of the diaper so as to receive and to hold excretions (See Fig. 2). The cushion pads 14 cover the space or pocket 42 except the clearance 41 substantially to avoid an apprehension that the wearer's skin might be stained with excretions held in the space or pocket 42. Such arrangement of the cushion pads 14 are preferable not only from the viewpoint of sanitation but also to appearance, since the interior of the space 42 holding therein excretions is substantially covered with the cushion pads 14.

[0022] Each of the cushion pads 14 is relatively wide and soft. Additionally, the filaments constituting the cushioning member 22 are deformable so as to follow the wearer's body curve and movable at least transversely within the covering member 18. These factors allow the cushion pads 14 to fit the wearer's skin over a relatively large area and thereby to prevent leakage of urine or soft passage from occurring due to a noticeable gap between the pads 14 and the skin even if the pads 14 are not tightly placed against the skin.

[0023] The invention is not limited to the illustrated embodiment but can be implemented in the other various manners without departing from the scope of the invention. For example, the front wing 36 may be composed of a pair of stretchable wings as in the case of the rear wing 37. If the rear wings are dimensioned to be relatively large circumferentially around the wearer's waist, the front wings 36 can be eliminated. The inner side edges 14A of the respective cushion pads 14 may be more or less spaced from each other so long as the diaper is in its unfolded state as shown by Fig. 1. It should be understood here that a distance by which these inner side edges 14A may be spaced from each other is preferably less than 20 mm in the crotch region 8. Bonding of the diaper components may be achieved by means of suitable adhesive agent such as hot melt adhesive or by means of heat-sealing so far as the components to be bonded together are of heat-sealable nature.

[0024] With the disposable diaper provided by the invention, the tops of the respective leakage proofing walls are defined by a pair of the cushion pads each having a relatively large width. These cushion pads are elastically stretchable longitudinally of the diaper, on one hand, and elastically contractile in the direction of their thickness. Accordingly, the tops of the respective leakage proofing walls fit to the wearer's skin over a large area and avoid leakage of body fluids even if the tops of the respective leak proofing walls are not tightly placed against the skin.

[0025] The cushioning member of the pads is composed of a plurality of filaments extending in parallel one to another longitudinally of the diaper. The individual filaments are deformable and movable so as to follow a curved surface of the wearer as the cushion pads are placed against the wearer's skin. Such feature advantageously ensure a good fit of the cushion pads to the wearer's skin.

[0026] A pair of the cushion pads cooperate with the associated leakage proofing walls to form the excretion holding space or pocket. More specifically, these cushion pads are spaced from each other to form an opening of the space or pocket as a pair of the rings in the rear waist region are pulled in opposite directions circumferentially around the wearer's waist. By adjustably pulling the cushion pads depending on the wearer's body dimensions, the width of the opening can be adjusted in proportion to the body dimensions and the wearer's skin can be protected from being stained with excretion held in the space or pocket.

Claims

1. A disposable diaper having a front waist region, a rear waist region and a crotch region extending in a longitudinal direction of the diaper between these waist regions, said diaper comprising a liquid-permeable topsheet, a liquid-impermeable backsheet and a liquid-absorbent core disposed therebetween, and a pair of leakage proofing walls adapted to rise up on an inner surface of said diaper when the diaper is worn, wherein:

   said pair of leakage proofing walls have tops thereof defined by a pair of 20 ~ 100 mm wide cushion pads, each having an elastic stretcha-

bility in said longitudinal direction and an elastic contractility in a thickness direction of said diaper.

2. The disposable diaper according to Claim 1, wherein each of said cushion pads comprises a tube-like covering member, an elastic member secured to an inner surface of said covering member under a tension in said longitudinal direction and a cushioning member composed of plural crimped filaments arranged inside said covering member so as to extend in parallel one to another in said longitudinal direction.

3. The disposable diaper according to Claim 2, wherein said cushioning member comprises filaments having a fineness of 0.5 - 10 deniers and occupies 30 ~ 80 % of a cross-sectional area defined by said covering member.

4. The disposable diaper according to Claim 1, further including a pair of elastic wings extending outward from transversely opposite side edges of said rear waist region each having an elastic stretchability in a transverse direction of said diaper and comprising first and second elastic wings lying on inner and outer sides of said diaper, respectively; wherein said first and second elastic wings have distal ends thereof bonded together; and wherein, at proximal ends of said first and second elastic wings, said first elastic wing is at least partially bonded to the associated one of said cushion pads and said second elastic wing is bonded to an outer surface of said rear waist region along the associated side edge thereof.

5. The disposable diaper according to Claim 1, wherein an inner side edges of the respective cushion pads are spaced from each other by 0 ~ 20 mm in said crotch region.

6. The disposable diaper according to Claim 1, wherein said covering member is formed of a hydrophobic nonwoven fabric.

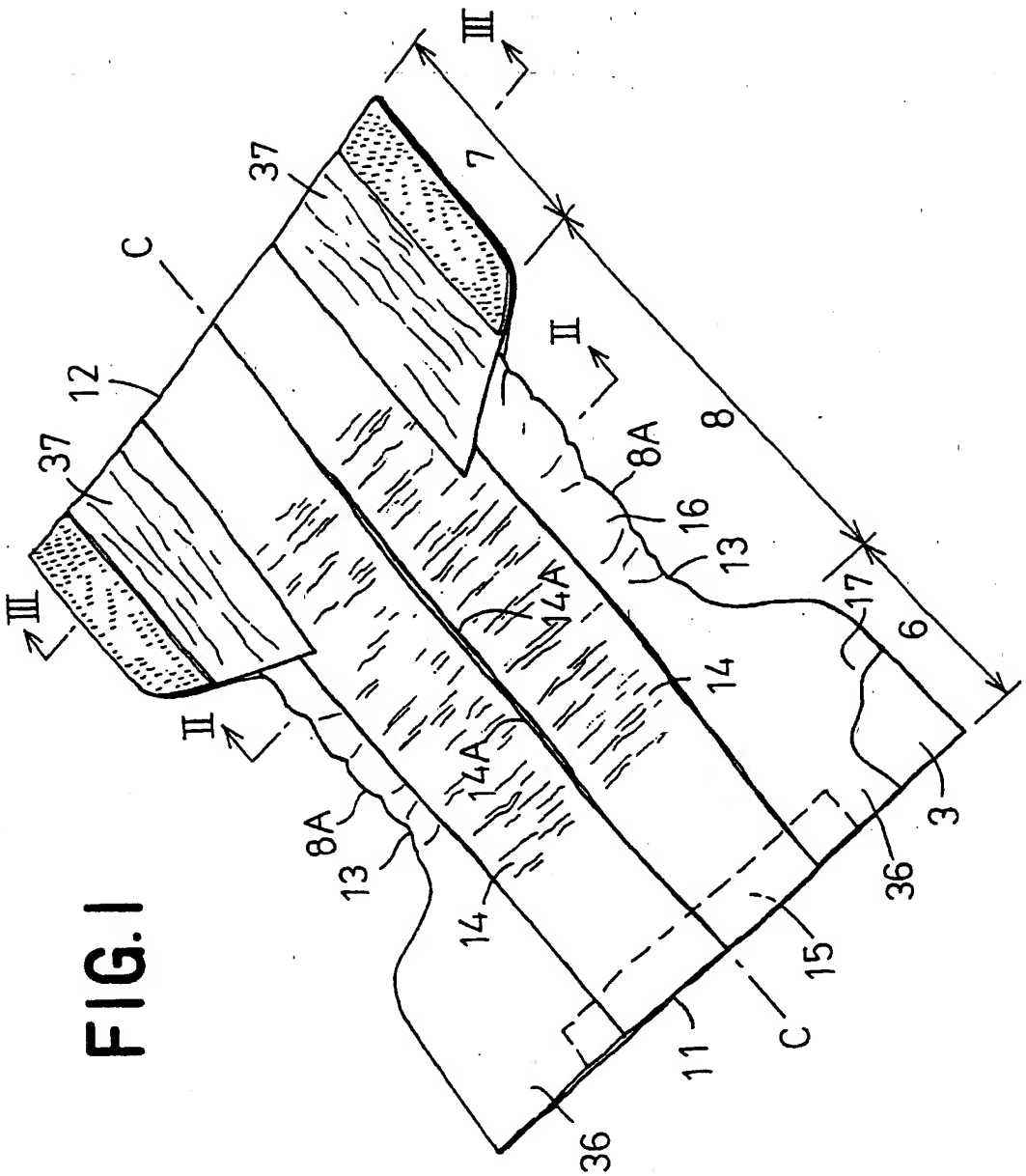


FIG. 1

FIG.2

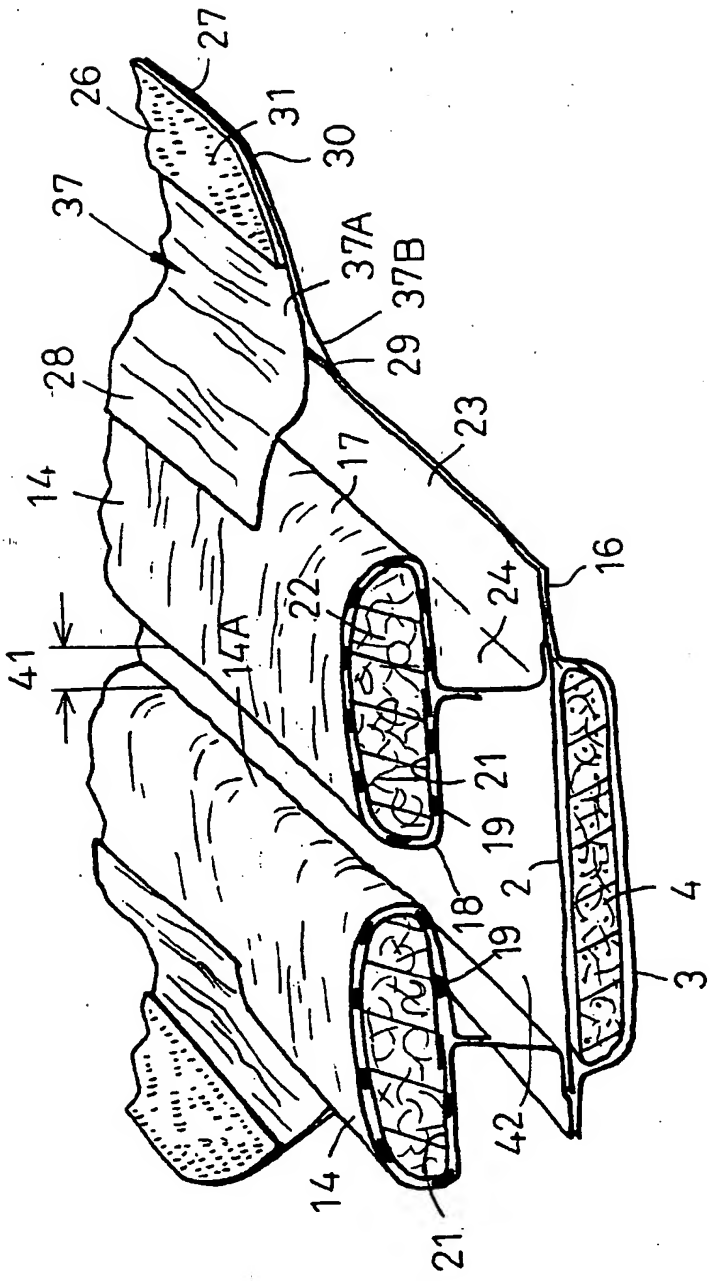
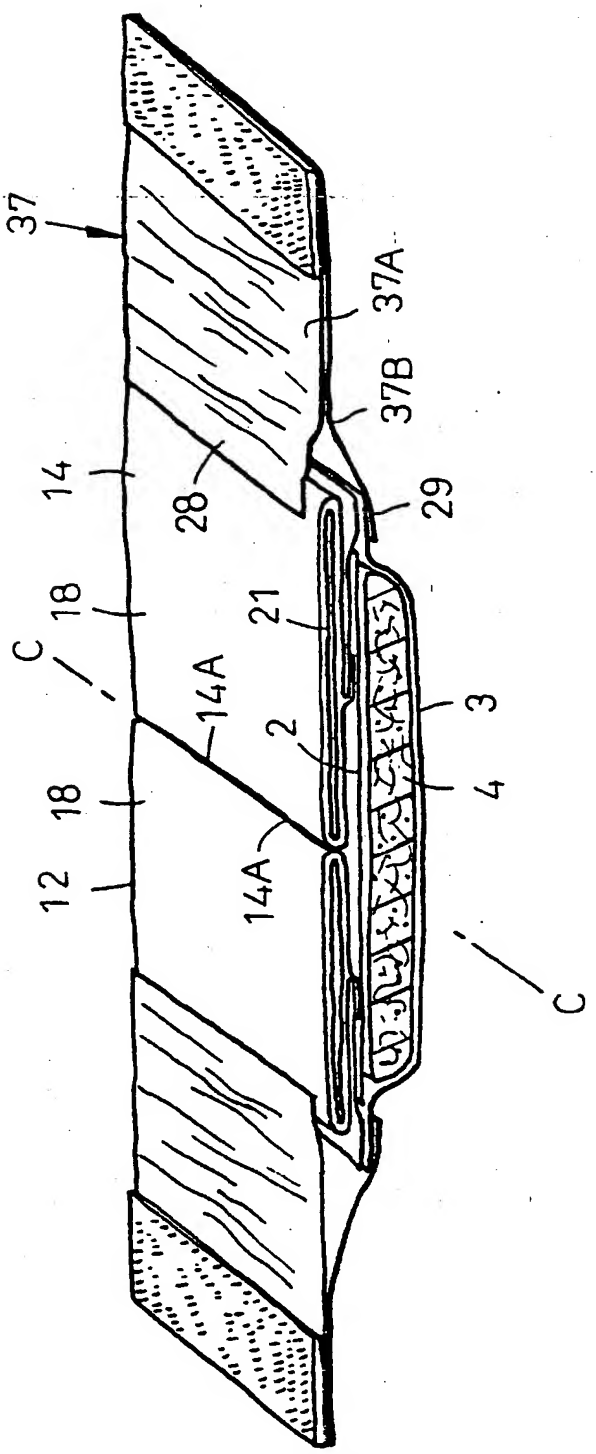


FIG.3



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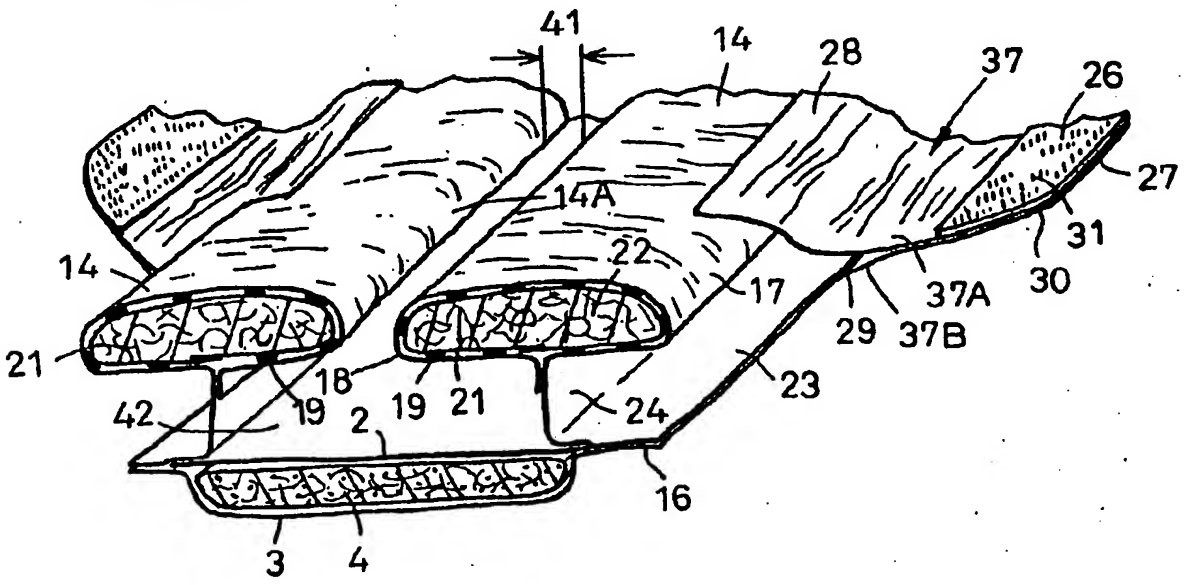

EP 0 904 757 A3

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EUROPEAN SEARCH REPORT

Application Number
EP 98 30 7862

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Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int.Cl.6)
Y	EP 0 346 477 A (UNI-CHARM) 20 December 1989 * column 4, line 4 - line 20 * * column 5, line 33 - line 47 * * column 6, line 37 - line 46 * * column 7, line 19 - line 30; claim 1; figures 2,5,9,11 *	1-6	A61F13/15
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Y	WO 96 07381 A (PROCTER & GAMBLE) 14 March 1996 * page 24, line 30 - page 26, line 33; figures 5,14-17 *	1-6	
A	WO 97 21409 A (KIMBERLY-CLARK) 19 June 1997 * page 10, line 17 - page 14, line 2; claims 1,2; figures 2,3,9 *	1-6	
			TECHNICAL FIELDS SEARCHED (Int.Cl.6) A61F

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
THE HAGUE	12 February 1999	Magrizos, S

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